



PLASTIC AND THE ENVIRONMENT

Plastics help the environment by reducing material use, energy use and waste. The environmental cost of using plastics in consumer products and packaging is nearly *four times less* than the cost of using other materials.



From American
Chemistry Council

PLASTIC AND THE ENVIRONMENT

Plastics help packaging do more with less. Plastic packaging delivers more food with less waste and energy use. By extending the shelf life of food, a little bit of plastic packaging can prevent a lot of food waste



From American
Chemistry Council

PLASTIC AND THE ENVIRONMENT

Lighter cars use less fuel. To improve fuel efficiency, carmakers increasingly turn to strong yet lightweight plastics, including carbon fiber-reinforced plastics. Modern cars are comprised of 50 percent plastics by volume, yet only ten percent by weight.



From American
Chemistry Council

PLASTIC AND THE ENVIRONMENT

Increasing home energy efficiency can help significantly reduce energy use. Plastic building products help homeowners save on energy use. The use of plastic building materials saves enough energy for 4.6 million households.



From American
Chemistry Council

- **Issue:** LyondellBasell does not want plastic pellets to be released to the environment.

Return railcars from customers do not always have the discharge tube caps secured. Residual polymers remaining in the railcar may **spill in transit**.

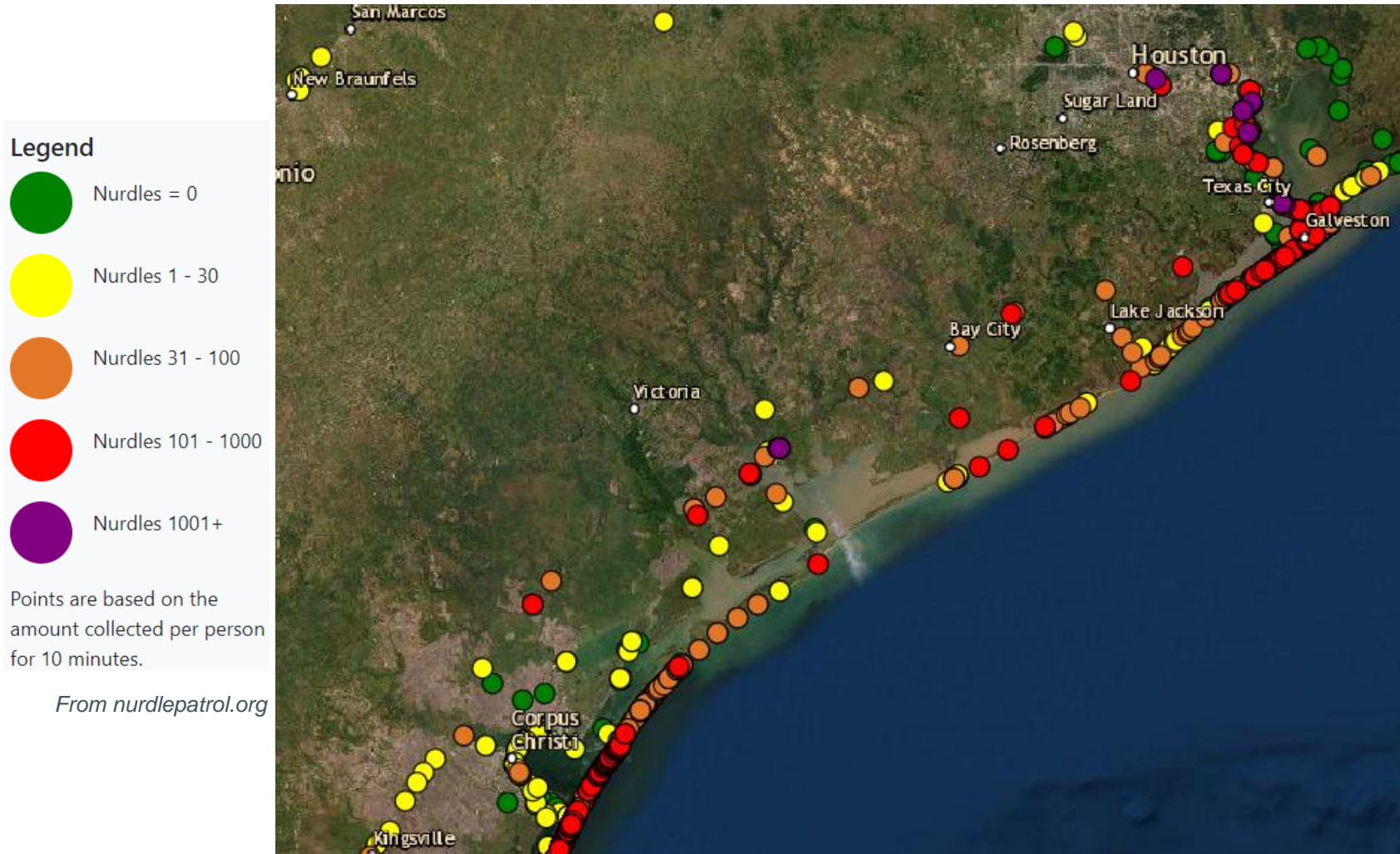
- **What LyondellBasell is doing about this:**

- Tracking system/dashboard for open caps.
- Regular communication with customers and distribution centers.
- Completed a trial of securing caps with car seals, followed by an independent inspection.
- Developed a technical assistance document for customers.

See the following slides for more information on these efforts.



- Environmental groups report where they find polymer pellets (aka “nurdles”) in the environment.



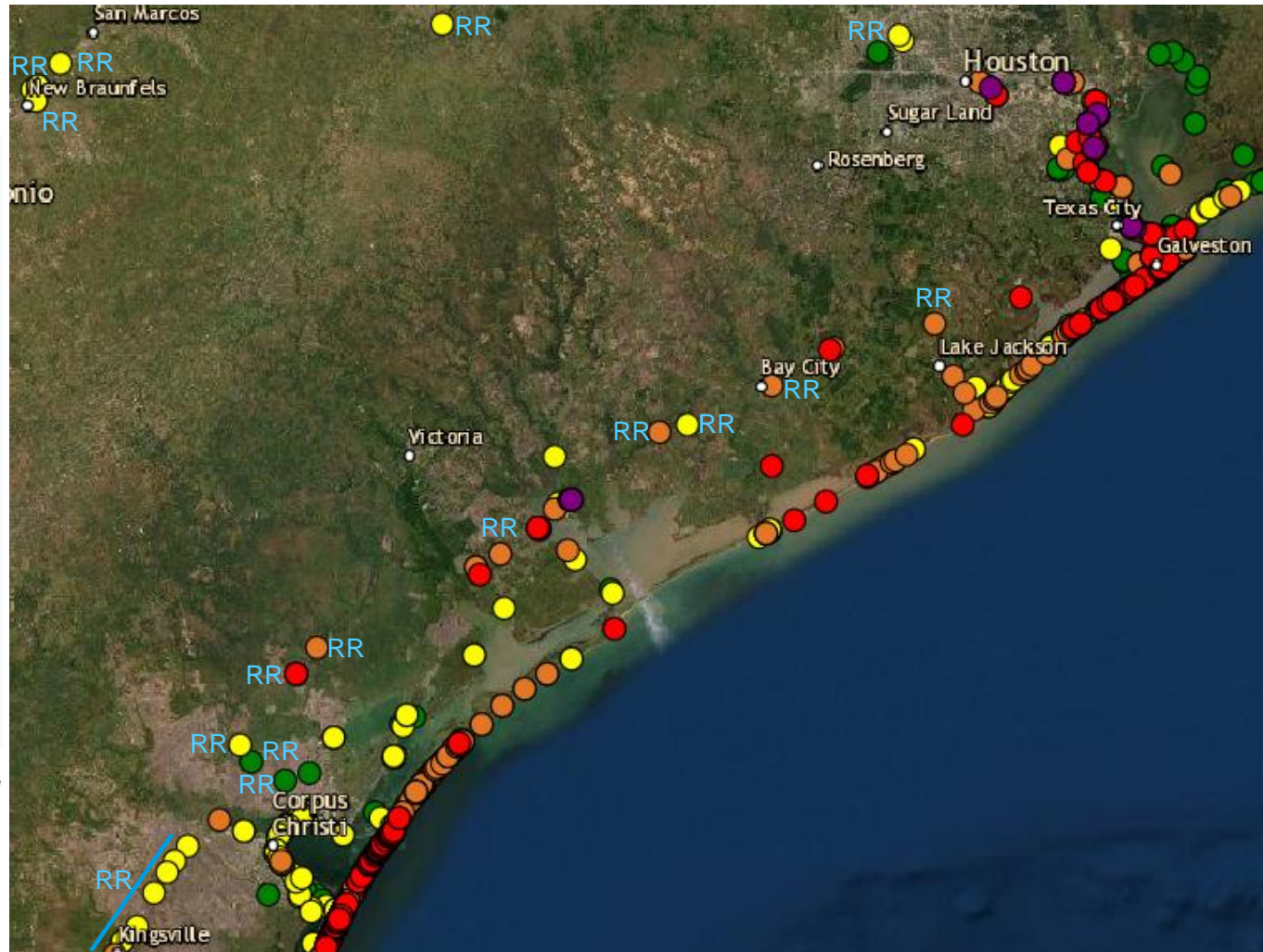
- “RR” indicates observations along railroad tracks.

Legend



Points are based on the amount collected per person for 10 minutes.

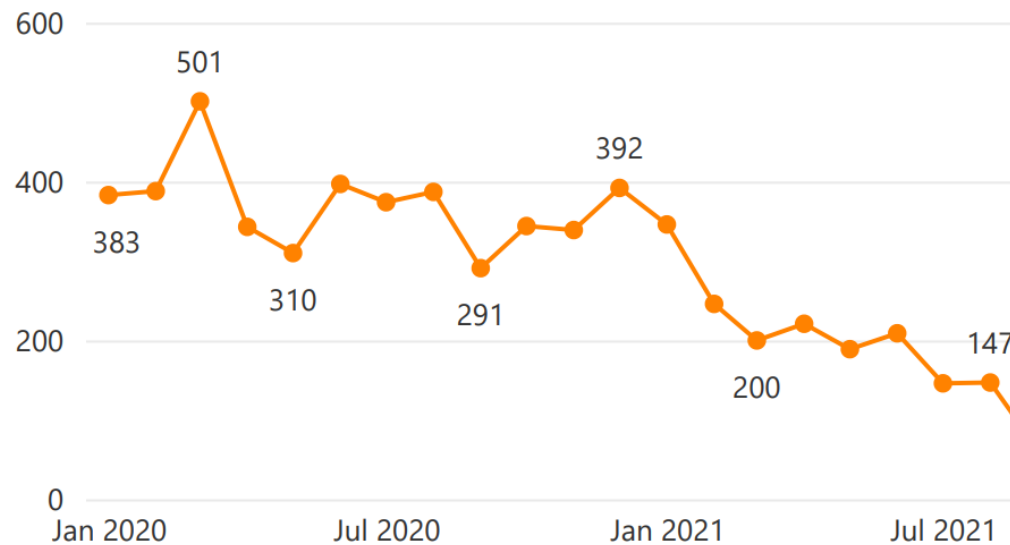
From nurdlepatrol.org



LyondellBasell Open Cap Tracking System – Example

- In 2020, LyondellBasell implemented a test system to track open caps on return railcars.

Number of Railcars with Open Discharge Cap(s) by Month



- Currently, the data triggers the following action:

- Quarterly review with distribution centers and transloaders
- Account Specialist notification to external customer
- Reviewed monthly within LyondellBasell

In 2021, we developed a program to further eliminate open railcar caps.

■ Phase 1

- Pilot program that required car seals + inspections on over 300 return hopper cars.
- Results were 98% effective for domestic shipments.

■ Phase 2

- Implemented at all LyondellBasell sites effective July 1, 2021.

■ Phase 3

- [Share best practices](#) and support implementation for external customers.



examples
sheet.

	Date	Car number	Note (not required)
2			
3	2/1/2021	EQUX631216	Bottom tube damaged. Bottom valves closed.
4	2/8/2021	MLLX 10650	
5	2/8/2021	MLLX 98119	
6	2/8/2021	EQUX 13253	
7	2/10/2021	EQUX 19268	
8	2/10/2021	MLLX 97357	
9	2/10/2021	MLLX 97479	
10	2/10/2021	MBKX 170204	
11	2/10/2021	EQUX 13829	
12	2/12/2021	EQUX 13780	
13	2/12/2021	MLLX 10576	
14	2/12/2021	MLLX 2410	
15	2/15/2021	XOMX710065	
16	2/15/2021	EQUX013873	

Inspection Sheet

Phase 2 is complete – realized 98% reduction in open caps for US shipments.

LyondellBasell wants to eliminate pellet loss from railcars. We need your help.

Customers that return empty hopper cars should:

1. Apply **car seals** to all eight bottom tube caps before railcars leave the site.
 - Car seals can be plastic cable ties if desired.
2. **Inspect** both sides of all railcars before they leave the site to ensure that all eight bottom tube caps are car sealed.
 - Inspections should be **independent**, meaning they are conducted by someone who is not actually responsible for applying the car seals.



Going forward,

- LyondellBasell will continue to monitor railcar caps and work with our customers to eliminate open caps.
- LyondellBasell also offers:
 - Polymer Hopper Car Unloading Tech Topic
 - Handling and Storage of LyondellBasell Polymers

See [lyondellbasell.com/en/products-technology/polymers/](https://www.lyondellbasell.com/en/products-technology/polymers/)

TECH TOPIC

Polymer Hopper Car Unloading

There are several topics to consider when receiving LyondellBasell polymers in railcars. The following should be considered when developing an effective hopper car unloading procedure.

1. Know the product in the railcar.

- a. Read shipping documentation to confirm the railcar number and content.
- b. Read the Safety Data Sheet (SDS) for the product (available at www.LYB.com.) The SDS contains safety recommendations specific to each product that must be followed.

2. Take steps to secure the railcar so it can be safely unloaded.

- a. Never inspect the contents or connect unloading equipment to a railcar while it is connected to a locomotive.
- b. A best practice is to decouple the railcar and place de-railers on the track to prevent unintentional movement.
- c. Place signs on all sides of the railcar to alert others the railcar is being unloaded.
- d. Use safe fall protection procedures if you must work at heights.

3. Prepare the railcar and surrounding area.

- a. Ensure good house keeping in the unloading area.
- b. Inspect the surrounding area for hazards.
- c. Inspect the railcar for damage and tampering.
 - i. Verify cable seals are in place.
 - ii. It is a best practice to use an unloading checklist that documents the cable tie ID numbers.

4. Unload the railcar – Utilize a checklist procedure to unload the railcar that takes the following into consideration

- a. Proper grounding and bonding must be in place. Conveying of polymer generates static electricity, which may lead to an injury from shock or act as an ignition source for a fire or dust explosion.
- b. Spill prevention – include steps to prevent, contain, and immediately clean up any spills. Consider using a catch pan.



- c. Product contamination – Inspect hoses and unloading equipment to make sure they are free from contaminants. Open hoses ends should never be placed on the ground.
- d. Transfer velocity should be in target range for your system. Excessive transfer rates may result in formation of fines and streamers.
- e. Transfer temperature should be in target range for the product being transferred. High conveying temperature may result in formation of fines and streamers.